Claim Status

1. (previously presented) Apparatus for controlling motion of a motor driven element in a vehicle over a range of motion and for altering said motion when undesirable resistance to said motion is encountered, said apparatus comprising:

a) a sensor for measuring a parameter of a motor coupled to the motor driven element that varies in response to a resistance to motion during all or part of a range of motion of the motor driven element;

b) a memory for storing a number of measurement values from the sensor based on immediate past measurements of said parameter over at least a portion of a present traversal of said motor driven element through said range of motion;

c) a controller coupled to the memory for determining to de-activate the motor based on a most recent sensor measurement of the parameter and the immediate past measurement values stored in the memory obtained during a present run through the motor driven element range of motion; and

d) a controller interface coupled to the motor for altering motion of said motor driven element during the present run in response to a determination made by the controller.

2. (previously presented) A method for controlling motion of a motor driven element in a vehicle over a range of motion and for altering said motion when undesirable resistance to said motion is encountered, said method comprising:

a) measuring a parameter of a motor coupled to the motor driven element that varies in response to a resistance to motion during all or part of a range of motion of the motor driven element by taking a multiplicity of measurements as the motor moves the motor driven element over its range of motion;

b) storing a number of measurement values based on measurements of said parameter over an immediate past portion of a present run through said range of motion;

c) determining that the parameter is outside a parameter range based on stored

measurement values obtained during the immediate past portion as the motor driven element moves over its range of motion; and

d) altering motion of said motor driven element during the present run in response to a determination that the parameter is outside the parameter range.

3. (Original) The method of claim 2 wherein the motor driven element is a window or panel and additionally comprising reverse actuating the window or panel prior to moving said window or panel in a direction to close the window or panel.

4. (Original) The method of claim 3 additionally comprising maintaining a position of the window or panel based on the sensed parameter and the reverse actuation is initiated if a leading edge of the window or panel is near a closed position.

5. (Original) The method of claim 4 movement is first initiated toward a closed position when a leading edge of the window or panel is near the closed position and wherein the reverse actuation is performed upon a sensing of an obstacle that is based on determining the parameter is outside the parameter range.

Please cancel claims 6 – 8 without prejudice or disclaimer.

6 – 8 (Cancelled)

9. (Cancelled)

Please cancel claims 10 and 11 without prejudice or disclaimer.

10 & 11. (Cancelled)

12. (Previously Presented) Apparatus for controlling activation of a motor for moving an object along a travel path and de-activating the motor if an obstacle is encountered by the object comprising:

a) a movement sensor for monitoring movement of the object as the motor moves said object along a travel path;

b) a switch for controlling energization of the motor with an energization signal; and

c) a controller including an interface coupled to the switch for controllably energizing the motor and said interface additionally coupling the controller to the movement sensor for monitoring signals from said movement sensor; said controller comprising a stored program that:

i) determines motor speed of movement from an output signal from the movement sensor ;

ii) calculates an obstacle detect threshold based on motor speed of movement detected during a present run of said motor driven element;

iii) compares a value based on currently sensed motor speed of movement with the obstacle detect threshold; and

iv) outputs a signal from the interface to said switch for stopping the motor if the comparison based on currently sensed motor movement indicates the object has contacted an obstacle.

13. (Original) The apparatus of claim 12 wherein the controller includes a buffer memory for storing successive values of motor movement for use in determining the obstacle detect threshold.

14. (Original) The apparatus of claim 12 wherein the controller includes a clock and an input from the movement sensor is in a form of a sequence of pulses and further wherein the controller counts clock signals occurrences between receipt of pulses to provide an indication of motor speed.

15. (Original) The apparatus of claim 12 wherein the controller includes an interface for monitoring user actuation of control inputs for controlling movement of the window or

panel and wherein the controller maintains a motor energization sequence a specified minimum time period in response to a short period user actuation of said control inputs to maintain position accuracy in monitoring window or panel movement.

16. (Original) The apparatus of claim 12 wherein the controller includes an interface for monitoring user actuation of control inputs for controlling movement of the object and wherein in response to a specified input the controller conducts a calibration motor energization sequence to determine parameters of object.

17. (Original) The apparatus of claim 12 wherein the motor is coupled to a motor vehicle window or panel and wherein the controller includes an interface for monitoring user actuation of control inputs for controlling movement of the window or panel and wherein the controller maintains a position indication which is updated in response movement of the window or panel and further wherein the controller reverse actuations the motor near an end point in an object path of travel to avoid false obstacle detection in the region of closure of the window or panel.

18. (Original) The apparatus of claim 12 wherein the sensor is a current sensor and wherein the controller includes means for adjusting the obstacle threshold based on dynamic motor current as sensed from the current sensor to take into account varying loads experienced by the motor.

19. (previously presented) Apparatus for controlling activation of a motor for moving a window or panel along a travel path and de-activating the motor if an obstacle is encountered by the window or panel comprising:

a) a sensor for sensing movement of a window or panel along a travel path;

b) a switch for controlling energization of the motor with an energization signal; and

c) a controller coupled to the switch for controllably energizing the motor and

having an interface coupling the controller to the sensor and to the switch; said controller comprising decision making logic for:

i) monitoring a signal from the sensor;

ii) calculating a real time obstacle detect threshold based on the signal that is detected during at least one prior period of motor operation during movement along a present or current run through a path of travel of said window or panel ;

iii) comparing a value based on a currently sensed motor parameter with the obstacle detect threshold; and

iv) stopping movement of the window or panel by controlling an output to said switch that controls motor energization if the comparison based on a currently sensed motor parameter indicates the window or panel has contacted an obstacle.

20. (Previously Presented) Apparatus for controlling activation of a motor for moving a window or panel along a travel path and de-activating the motor if an obstacle is encountered by the window or panel comprising:

a) a sensor for generating speed signals representative of the window or panel speed as the motor moves the window or panel along a travel path;

b) an obstacle detection controller for monitoring at least a part of the travel path of the window or panel for sensing and generating an obstacle detect signal indicating the presence in said travel path of an obstacle to movement of the window or panel;

c) a switch coupled to said controller for controlling energization of the motor with an energization signal; and

d) said controller for processing speed signals and obstacle detection signals and controlling operation of the motor in response to said speed or obstacle detection signals; said controller including:

i) a storage for storing a number of speed signals that vary with motor speed;

ii) a processor for calculating an obstacle detect threshold based on one or more speed signals stored in said storage obtained in real time based on immediate past

measures of the speed signal sensed by the sensor to adapt to varying conditions encountered during movement along a present path of travel of said window or panel;

iii) a logic unit for making a comparison between a value representing window or panel speed based on a currently sensed motor speed signal with the calculated obstacle detect threshold, and generating a control output if an obstacle is detected based on said comparison; and

iv) an interface coupled to said switch for changing the state of the switch to stop the motor.

21. (Original) The apparatus of claim 20 wherein the sensor for generating a speed signal comprises a Hall-effect sensor.

22. (Original) The apparatus of claim 20 wherein the sensor for generating a speed signal comprises a magnetic pick-up.

23. (Original) The apparatus of claim 20 additionally comprising an obstacle detector having an output coupled to the controller that senses a disruption in a region through which the window or panel moves.

24. (Original) The apparatus of claim 23 wherein the obstacle detector comprises a microwave generator and a reflected wave transducer.

25. (Original) The apparatus of claim 23 wherein the obstacle detector comprises an infrared light source and detector.

26. (Previously Presented) The apparatus of claim 23 wherein the obstacle detector comprises a field effect device.

27. (Previously Presented) The apparatus of claim 26 wherein the field effect device

comprises a magnetic field inductive sensor.

Please cancel claims 28 – 32 without prejudice or disclaimer.

28 - 32. (cancelled)

33 -35. (Cancelled)

36. (Previously Presented) The apparatus of claim 1 wherein the immediate past measurements of said parameter were taken within a forty millisecond interval prior to the most recent sensor measurement.

37. (Cancelled)